

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
9 September 2005 (09.09.2005)

PCT

(10) International Publication Number
WO 2005/083036 A1

(51) International Patent Classification⁷: **C09K 11/73**,
11/64, 11/71, H01L 33/00

(US). **SOULES, Thomas, F.** [US/US]; 324 Claymore
Boulevard, Richmond Heights, OH 44143 (US).

(21) International Application Number:
PCT/US2005/006098

(74) **Agent: McCOLLISTER, Scott, A.**; Fay, Sharpe, Fagan,
Minnich & McKee, LLP, 1100 Superior Avenue, Seventh
Floor, Cleveland, OH 44114 (US).

(22) International Filing Date: 22 February 2005 (22.02.2005)

(81) **Designated States** (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA,
ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/546,595 20 February 2004 (20.02.2004) US

(84) **Designated States** (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

(71) **Applicant** (*for all designated States except US*): **GEL-
CORE LLC** [US/US]; 6180 Halle Drive, Valley View, OH
44125-4635 (US).

(72) **Inventors; and**

(75) **Inventors/Applicants** (*for US only*): **SETLUR, Anant**,
A. [US/US]; 2081 Orchard Park, Niskayuna, NY 12309
(US). **SHIANG, Joseph** [US/US]; 2524 Hilltop Road,
Niskayuna, NY 12309 (US). **COMANZO, Holly, Ann**
[US/US]; 2506 Eastern Parkway, Niskayuna, NY 12309
(US). **BECKER, Charles, A.** [US/US]; 1010 Lamplighter
Road, Schenectady, NY 12309 (US). **DUCLOS, Steven**
[US/US]; 61 Carriage Road, Clifton Park, NY 12065 (US).
SRIVASTAVA, Alok, Mani [US/US]; 1378 Philomena
Road, Niskayuna, NY 12309 (US). **WEAVER, Stanton**
[US/US]; 119 Hemlock Terrace, Northville, NY 12134

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) **Title:** RULES FOR EFFICIENT LIGHT SOURCES USING PHOSPHOR CONVERTED LEDS

(57) **Abstract:** An LED lamp including an LED and one or more phosphors, wherein for each phosphor, a figure of merit (FOM) defined as the product of (incident LED flux) x (excitation cross-section of the phosphor) x (phosphor material decay time) is less than 0.3. Such an arrangement provides a light emitting device with improved lumen output and color stability over a range of drive currents.



WO 2005/083036 A1